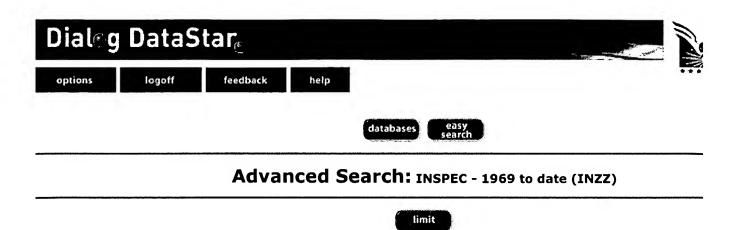
L Number	Hits	Search Text	DB	Time stamp
2	1	6789039.pn. and point and light	USPAT	2004/11/03 13:43
3	1	6789039.pn.	USPAT	2004/11/03 13:43
4	18	("4381608"   "4490849"   "4631598"   "4639878"   "4653104"	USPAT	2004/11/03 13:46
		"4945493"   "5699444"   "5764516"   "5832106"   "5870490"		
		"5933921"   "6009189"   "6101268"   "6101455"   "6138196"		
5	0	"6219063"   "6249234"   "6359647").PN.   6789039.URPN.	USPAT	2004/11/03 13:43
6		("4381608"   "4490849"   "4631598"   "4639878"   "4653104"	USPAT	2004/11/03 13:52
		"4945493"   "5699444"   "5764516"   "5832106"   "5870490"	******	
		"5933921"   "6009189"   "6101268"   "6101455"   "6138196"		
		"6219063"   "6249234"   "6359647").PN. and (((moving or		
		movement or displacing or displacement or motion) near4		
		(point or focus or spot or dot) near4 (light or laser or ray or		
		beam)) with (((flat or plane or planar) near3 (surface or extent or expanse)) or (floor or wall or ceiling)))		
7	ol	("4381608"   "4490849"   "4631598"   "4639878"   "4653104"	USPAT	2004/11/03 13:53
'		"4945493"   "5699444"   "5764516"   "5832106"   "5870490"		
		"5933921"   "6009189"   "6101268"   "6101455"   "6138196"		
		"6219063"   "6249234"   "6359647").PN. and ((moving or		
		movement or displacing or displacement or motion) near4		
		(point or focus or spot or dot) near4 (light or laser or ray or beam)) and (((flat or plane or planar) near3 (surface or extent		
		or expanse)) or (floor or wall or ceiling))		,
8	0	("4381608"   "4490849"   "4631598"   "4639878"   "4653104"	USPAT	2004/11/03 13:54
		"4945493"   "5699444"   "5764516"   "5832106"   "5870490"		
		"5933921"   "6009189"   "6101268"   "6101455"   "6138196"		
		"6219063"   "6249234"   "6359647").PN. and ((moving or movement or displacing or displacement or motion) near4		
	i	(point or focus or spot or dot) near4 (light or laser or ray or		
[		beam))		
9	300	((calibrat\$3 or modif\$7 or adjust\$4 or alter\$5) near3 (camera	USPAT;	2004/11/03 14:00
		or imager or (photo\$detector or (imaging adj (device or	US-PGPUB;	
		apparata or apparatus))))) and ((moving or movement or displacing or displacement or motion) near4 (point or focus or	EPO; JPO; DERWENT;	
		spot or dot) near4 (light or laser or ray or beam))	IBM_TDB	
10	102	((calibrat\$3 or modif\$7 or adjust\$4 or alter\$5) near3 (camera	USPAT;	2004/11/03 14:06
		or imager or (photo\$detector or (imaging adj (device or	US-PGPUB;	
		apparata or apparatus))))) and ((moving or movement or	EPO; JPO;	
		displacing or displacement or motion) near4 (point or focus or spot or dot) near4 (light or laser or ray or beam)) and (relat\$3	DERWENT;	
		near3 (camera or imager or (photo\$detector or (imaging adj		
		(device or apparata or apparatus)) near3 (position or location	l	•
		or orientation or placement))))	LIGDAT	000444400 00.45
-	189	73/1.01.ccls.	USPAT; US-PGPUB	2004/11/02 09:45
_	103	73/1.75.ccls.	USPAT:	2004/11/02 09:45
	103	1 3.11. 3.000.	US-PGPUB	
-	220	73/1.79.ccls.	USPAT;	2004/11/02 09:45
		Laure	US-PGPUB	0004/44/00 00 40
-	367	348/135.ccls.	USPAT; US-PGPUB	2004/11/02 09:46
	536	356/614.ccls.	USPAT:	2004/11/02 09:46
-	550	000/017.0016.	US-PGPUB	
-	293	382/286.ccls.	USPAT;	2004/11/02 09:46
			US-PGPUB	0004/44/00 00 15
-	244	382/289.ccls.	USPAT;	2004/11/02 09:46
	102	702/1.ccls.	US-PGPUB USPAT:	2004/11/02 09:46
	102		US-PGPUB	
-	244	702/33.ccls.	USPAT;	2004/11/02 09:46
			US-PGPUB	0004/44/00 00 10
-	113	702/40.ccls.	USPAT; US-PGPUB	2004/11/02 09:46
	411	702/85.ccls.	USPAT;	2004/11/02 09:46
	7''	7.52.55.65	US-PGPUB	355.77762 00.70
-	311	702/94.ccls.	USPAT;	2004/11/02 09:47
			US-PGPUB	

-	191	702/95.ccls.	USPAT;	2004/11/02 09:47
			US-PGPUB	
-	122	702/105.ccls.	USPAT;	2004/11/02 09:47
-	256	702/127.ccls.	US-PGPUB USPAT;	2004/11/02 09:47
,			US-PGPUB	
-	648	702/150.ccls.	USPAT; US-PGPUB	2004/11/02 09:47
-	257	702/151.ccls.	USPAT;	2004/11/02 09:47
			US-PGPUB	
-	211	702/152.ccls.	USPAT; US-PGPUB	2004/11/02 09:47
-	173	702/153.ccls.	USPAT;	2004/11/02 09:48
		700/05   1.70 404	US-PGPUB	0004/44/00 00 40
-	0	702/85.ccls. and 73.101.ccls.	USPAT; US-PGPUB	2004/11/02 09:48
-	0	702/85.ccls. and 73.175.ccls.	USPAT;	2004/11/02 09:49
		702/95 pale, and 72 170 pale	US-PGPUB	2004/11/02 00:40
	0	702/85.ccls. and 73.179.ccls.	USPAT; US-PGPUB	2004/11/02 09:49
-	0	702/85.ccls. and 356/614.ccls.	USPAT;	2004/11/02 09:49
_	o	702/85.ccls. and 382/286.ccls.	US-PGPUB USPAT;	2004/11/02 09:49
		702703.003. and 3027200.003.	US-PGPUB	2004/11/02 03:43
-	0	702/85.ccls. and 382/289.ccls.	USPAT;	2004/11/02 09:49
_	0	702/85.ccls. and 702/40.ccls.	US-PGPUB USPAT:	2004/11/02 09:50
			US-PGPUB	
-	0	702/85.ccls. and 702/152.ccls.	USPAT; US-PGPUB	2004/11/02 09:50
-	1	702/85.ccls. and 348/135.ccls.	USPAT;	2004/11/02 09:50
	2	702/95 calc. and 702/1 calc.	US-PGPUB USPAT:	2004/11/02 09:51
-		702/85.ccls. and 702/1.ccls.	US-PGPUB	2004/11/02 09.51
-	4	702/85.ccls. and 702/33.ccls.	USPAT;	2004/11/02 09:51
_	14	702/85.ccls. and 702/94.ccls.	US-PGPUB USPAT;	2004/11/02 09:53
,		•	US-PGPUB	
-	5	702/85.ccls. and 702/95.ccls.	USPAT; US-PGPUB	2004/11/02 09:56
· -	6	702/85.ccls. and 702/105.ccls.	USPAT;	2004/11/02 09:56
	_	700/05	US-PGPUB	2004/11/02 00:56
-	5	702/85.ccls. and 702/127.ccls.	USPAT; US-PGPUB	2004/11/02 09:56
-	10	702/85.ccls. and 702/150.ccls.	USPAT;	2004/11/02 09:56
_	1	702/85.ccls. and 702/151.ccls.	US-PGPUB USPAT;	2004/11/02 09:57
			US-PGPUB	
-	1	702/85.ccls. and 702/153.ccls.	USPAT; US-PGPUB	2004/11/02 09:59
-	0	((camera or spectrograph or imager) near3 (calibrat\$3 or	USPAT;	2004/11/03 07:29
		scal\$3)) and ((light or ray or beam) near3 (point or spot or	US-PGPUB	
		focus)) and (frame with "field of view") and ((plural\$3 or several or multiple or some or many or group) near3 (camera		
		or spectrograph or imager)) and (relat\$3 near3 (position or		
_	0	location or siting or site)) ((camera or imager) near3 (calibrat\$3 or scal\$3)) and ((light or	USPAT;	2004/11/02 10:13
		ray or beam) near5 (point or spot or focus) near5 (moving or	US-PGPUB	233 11 11 10 10 10
		motion or displacement)) and ((flat or planar or plane) near3		
		(surface or expanse)) and (frame with "field of view") and ((plural\$3 or several or multiple or some or many or group)		
		near3 (camera or imager)) and (relat\$3 near3 (position or		
		location))		

(point or spot or focus) with (moving or motion or displacement) with (flat or planar or plane) with (surface or expanse)) and (frame with "field of view") and (splanaf) (camera or imager) or multiple or some or many or group) nears (camera or imager) and (relat\$3 near\$ (position or location))  2315 camera near\$ calibrat\$3  4 (camera near\$ calibrat\$3 near\$ (position or location))  6 (r5227965" [*5432526"] *5548327" [*5805196"] [*6064423"]  7 (30031"), PN.  9 6710765 URPN.  14357 (calibrat\$3 near\$ (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and (moving or displac\$ or position\$3 or relocat\$3) and (flat or plane or planar) near\$ (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3 near\$ (flat or plane or planar) near\$ (surface or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3 (device or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3 (device or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3 (device or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3 (device or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near\$ (fight or ray or beam) near\$ (device or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near\$ (fight or ray or beam) near\$ (device or apparatus or appliance or module or component or element))) and (moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near\$ (fight or ray or beam) near\$ (device or apparatus or appliance or module or component or					
2315 camera near3 calibrat\$3 4 (camera near3 calibrat\$3) and ((light or ray or beam) with (point or spot or focus) with (moving or motion or displacement) with (flat or planer or plane) with (surface or expanse) 6 ("3227885"   5432526"   "5548327"   "5805196"   "6064423"   USPAT (300317).PM. of 710765.URPN. of 710765		0	displacement) with (flat or planar or plane) with (surface or expanse)) and (frame with "field of view") and ((plural\$3 or several or multiple or some or many or group) near3 (camera	USPAT; US-PGPUB	2004/11/02 10:16
4 (camera near3 calibrat\$3) and (light or ray or beam) with (point or spot or focus) with (mowing or motion or displacement) with (flat or planar or plane) with (surface or expanse))  6 ("5227885"   "5432526"   "5546327"   "5805196"   "6064423"   USPAT	-	2315			2004/11/02 10:15
6 ("5227958"  "5432526"  "5546327"  "5805196"  "6064423"   6303931",PM. 6710765 URPN. 4357 (dibitoratS) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displacS5 or positionS3 or locatS3 or repositionS3 or relocatS1) near4 (fight or ray or beam) near4 (point or area or region or dot or spot) with ((on or atop or element))) and ((moving or displacS5 or positionS3 or locatS3 or repositionS3 or relocatS3) near4 (fight or ray or beam) near4 (point or area or region or dot or spot) with (on or atop or element))) and ((moving or displacS5 or positionS3 or locatS3 or repositionS3 or relocatS3) near4 (fight or ray or beam) near4 (point or area or region or dot or spot) with (fight or ray or beam) near4 (point or area or region or dot or spot) with (and replane or module or component or element)))) and ((moving or displacS5 or positionS3 or locatS3 or repositionS3 or relocatS3) near4 (fight or ray or beam) near4 (point or area or region or dot or spot) with (fight or ray or beam) near4 (point or area or region or dot or spot)) with (fight or plane or plana) near4 (surface or extent or extention or expanse or expansion))  437 (calibratS3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displacS5 or positionS3 or locatS3 or repositionS3 or relocatS3) near4 (fight or ray or beam) near4 (point or area or region or dot or spot or (fiat adj surface))) and (fineoving or displacS5 or positionS3 or locatS3 or repositionS3 or relocatS3) near4 (gipt or ray or beam) near4 (point or area or region or dot or spot or (fiat adj surface)) and (first or primary or initial or plural or plurality or several or multiple or some or many) near3 (surface) or many) near4 (camera or ccd or imager or (maging near3 (device or apparatus or appliance or module or component or element))) and ((moving or or bland)) and (first or primary or initial or plural or plurality or seve	-	4	(point or spot or focus) with (moving or motion or displacement) with (flat or planar or plane) with (surface or	USPAT;	2004/11/02 10:26
Calibrat\$3 near4 (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element))))   Calibrat\$3 near4 (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and (imoving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot)) with ((on or atop or upon or across) near4 (flat) or plane or planary near4 (surface or extent or extention or expanse or expansion))   Signature or extent or extention or expanse or expansion)   Signature or planary near4 (surface or extent or expansion)   Signature or expansion)   Signature or expansion)   Signature or expansion)   Signature or expansion   Signature	-	6	("5227985"   "5432526"   "5546327"   "5805196"   "6064423"	USPAT	2004/11/02 10:23
Calibrat\$3 near4 (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot)) with ((no or atop or upon or across) near4 (flat or plane or planar) near4 (surface or extent to extention or expanse or expansion))   Calibrat\$3 near4 (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot))   Calibrat\$3 near4 (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot) with ((flat or plane or expansion))   A37 (alibrat\$3 near4 (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface)))   A38 (calibrat\$3 near4 (camera or cod or imager or (imaging near3 (device or apparatus or appliance or module or component or element))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface)) or module or component or element))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or locat\$3 or reposi	-		(calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or	USPAT; US-PGPUB; EPO; JPO; DERWENT;	2004/11/02 10:23 2004/11/03 07:32
(calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot) (calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot) (calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3) near4 (light or ray or beam) near4 (spoint or area or region or dot or spot) with (flat or plane or planar) near4 (surface or extent or extention or expanse or expansion))  437 (alibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and (moving or displac\$5 or position\$3 or locat\$3) or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plurality or several or multiple or some or many) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plurality or several or multiple or some or many) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or relocat\$3)) near4 (light or ray or beam) near4 (spoint or ray or beam) near4 (spoi	-	0	(device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot)) with ((on or atop or upon or across) near4 (flat or plane or planar) near4 (surface	USPAT; US-PGPUB; EPO; JPO; DERWENT;	2004/11/03 07:39
Calibrat\$3 near4 (Camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot) with (flat or plane or planar) near4 (surface or extention or expanse or expansion))   - 437 (calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3) or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plural or plurality or several or multiple or some or many) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plural or plurality or several or multiple or some or many) near3 (frame or window))   - 8 (calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near3 (frame or window))   - 8 (calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (point or area or region or dot or spot or (flat adj surface))) and ((moving or displac\$5 or position\$3 or relocat\$3)) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface)) and (first or primary or initial or plurality or plurality or plurality or several or multiple or some or many) near3 (frame or window))   - 65 (calibrat\$3 near4 (first or primary or initial or plurality or several or multiple or some or many) near3 (frame or window))   - 65 (calibrat\$3 near4 (first or primary or initial or plurality or several or multiple or some or many) near5 (point or area or region or dot or spot or (flat adj surface)) and (flist or primary or initial or plurality or several or multiple or some or many) near5 (point or area or region or dot or spot or	-	437	(calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4	US-PGPUB; EPO; JPO; DERWENT;	2004/11/03 07:43
Calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface)))   Calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plurality or several or multiple or some or many) near3 (frame or window))   Calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((first or primary or initial or plural or plurality or plurality or several or multiple or some or many) near4 (point or area or region or dot or spot or (flat adj surface)))   Calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (point or area or region or dot or spot or (flat adj surface)))   Calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or or module or component or element)))) and ((determin\$5 or measur\$5 or analy\$4) near4 relat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element))) near4 (position or location	-	. 11	(device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot)) with ((flat or plane or planar) near4 (surface or extent or extention or expanse or	US-PGPUB; EPO; JPO; DERWENT;	2004/11/03 07:39
Calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plurality or several or multiple or some or many) near3 (frame or window))	-	437	(calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4	US-PGPUB; EPO; JPO; DERWENT;	2004/11/03 07:44
- 8 (calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plural or plurality or several or multiple or some or many) near3 (frame or window))  - 65 (calibrat\$3 near4 (first or primary or appliance or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((determin\$5 or measur\$5 or analy\$4) near4 relat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element))) near4 (position or location)	•	78	(calibrat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial or plural or plurality or several or	USPAT; US-PGPUB; EPO; JPO; DERWENT;	2004/11/03 07:46
- 65 (calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((determin\$5 or measur\$5 or analy\$4) near4 relat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)) near4 (position or location	-	8	(calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((moving or displac\$5 or position\$3 or locat\$3 or reposition\$3 or relocat\$3) near4 (light or ray or beam) near4 (point or area or region or dot or spot or (flat adj surface))) and ((first or primary or initial	US-PGPUB; EPO; JPO; DERWENT;	2004/11/03 07:49
Search History 11/3/04 2:25:23 PM Page 3	-		near3 (frame or window)) (calibrat\$3 near4 (first or primary or initial or plural or plurality or several or multiple or some or many) near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)))) and ((determin\$5 or measur\$5 or analy\$4) near4 relat\$3 near4 (camera or ccd or imager or (imaging near3 (device or apparatus or appliance or module or component or element)) near4 (position or location or coordinate)))	US-PGPUB; EPO; JPO; DERWENT;	2004/11/03 09:34

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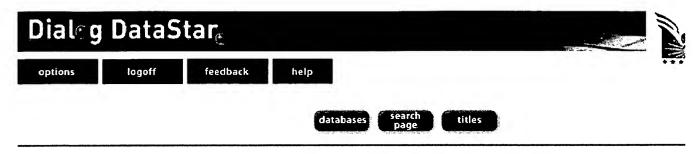
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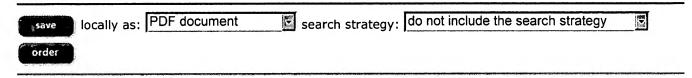
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## Author(s)

Kachi-D; Tu-X-W.

# **Author affiliation**

Centre de Recherches de Royallieu, Compiegne, France.

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#### **Abstract**

It is known from **geometric** optics that any system of lenses can be approximated by a system which realizes a perspective projection of a 3D scene onto a 2D plate. Projective geometry is an efficient tool to investigate such an image forming system. This paper treats the problem of calibrating cameras using this tool. In this work, a new formulation of calibrating a moving **camera** is presented, and is based on the absolute conic properties. The projective invariance of the absolute conic under rigid motion ensures that its image is independent of **camera** position, and depends only on the intrinsic parameters of the **camera**. The **camera calibration** is computed in two steps. First, the estimation of the coefficients of the epipolar transformation is estimated. The computation of the absolute conic image is based on the pole and polar of the conic. Then, relations between intrinsic parameters and coefficients of the absolute conic image are then deduced. Both computer-generated and real data are included in **experiments**, which illustrates how the method works. This technique is integrated in an

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iterative filtering scheme. (13 refs).

# **Descriptors**

<u>calibration</u>; <u>cameras</u>; <u>computer-vision</u>; <u>filtering-and-prediction-theory</u>; <u>geometrical-optics</u>; <u>iterative-methods</u>; <u>motion-estimation</u>.

#### Keywords

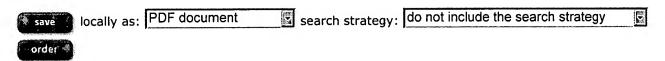
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**geometric camera calibration; geometric** optics; projective geometry; image forming system; absolute conic properties; rigid motion; epipolar transformation; absolute conic image; real data; computer generated data; iterative filtering scheme.

# **Classification codes**

B6140C	(Optical information and image processing).
B7130	(Measurement standards and calibration).
B0290F	(Interpolation and function approximation).
B7230G	(Image sensors).
C5260B	(Computer vision and picture processing).
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